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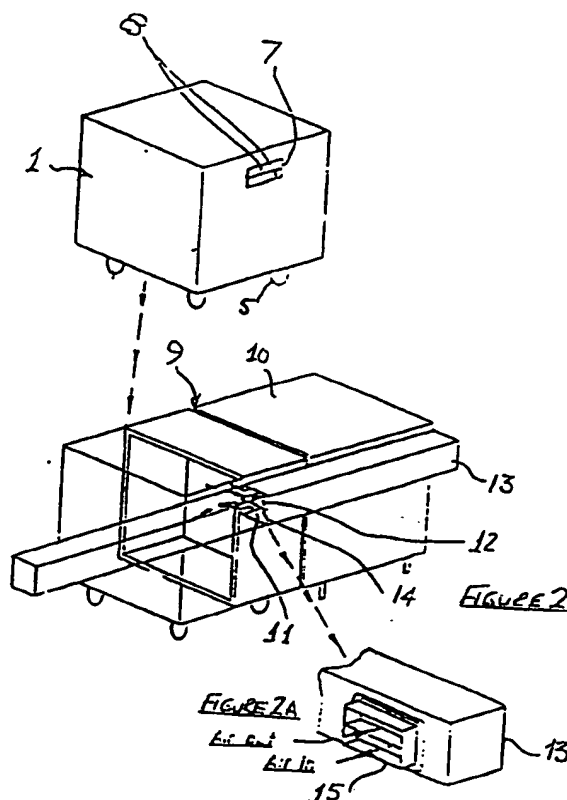
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(54) Food distribution system

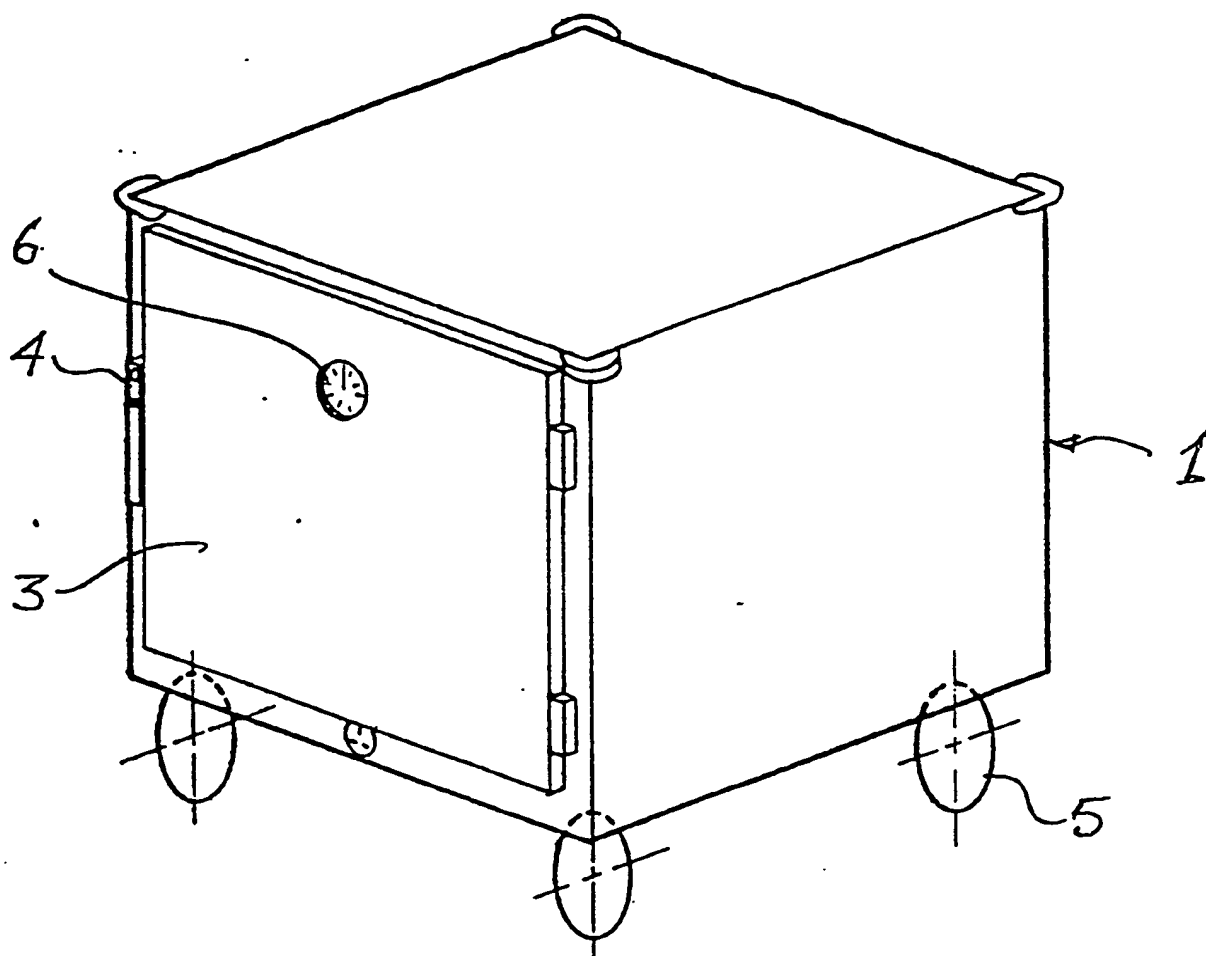
(57) A food distribution system comprises a mobile cassette having an insulated housing (1) with a closable door, electrical heating means within the housing, electrical control means for maintaining the interior of the housing at a required temperature (6) and air inlet and outlet openings (7) through the housing wall, which are self-closing (8) and adapted to open automatically when the cassette is connected onto a cold/refrigerated ducted air flow (13) of the system, the cassette thus being capable of providing a dual temperature facility. The mobile cassette may be designed to accommodate a mobile open rack.

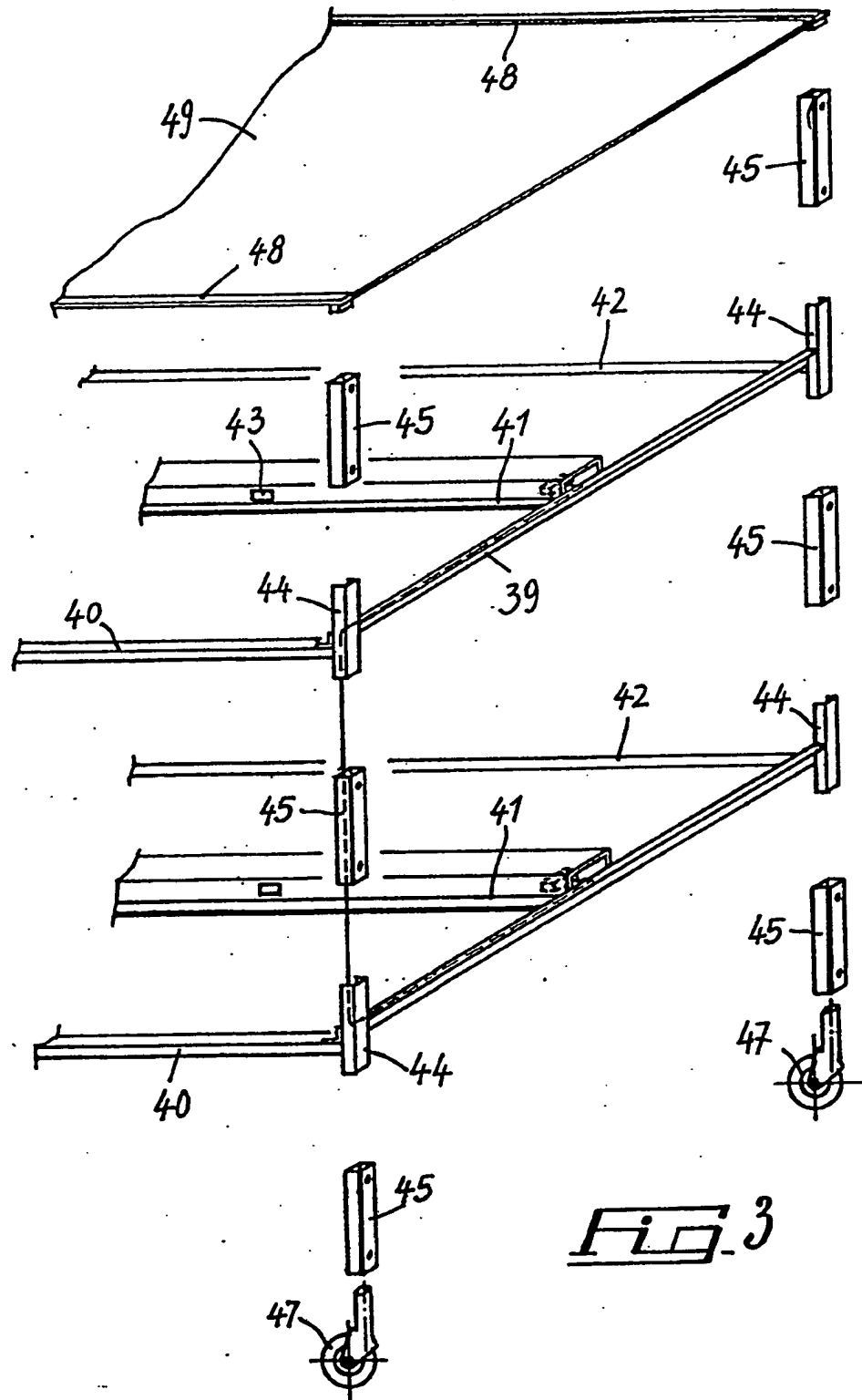


At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy
The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1982.

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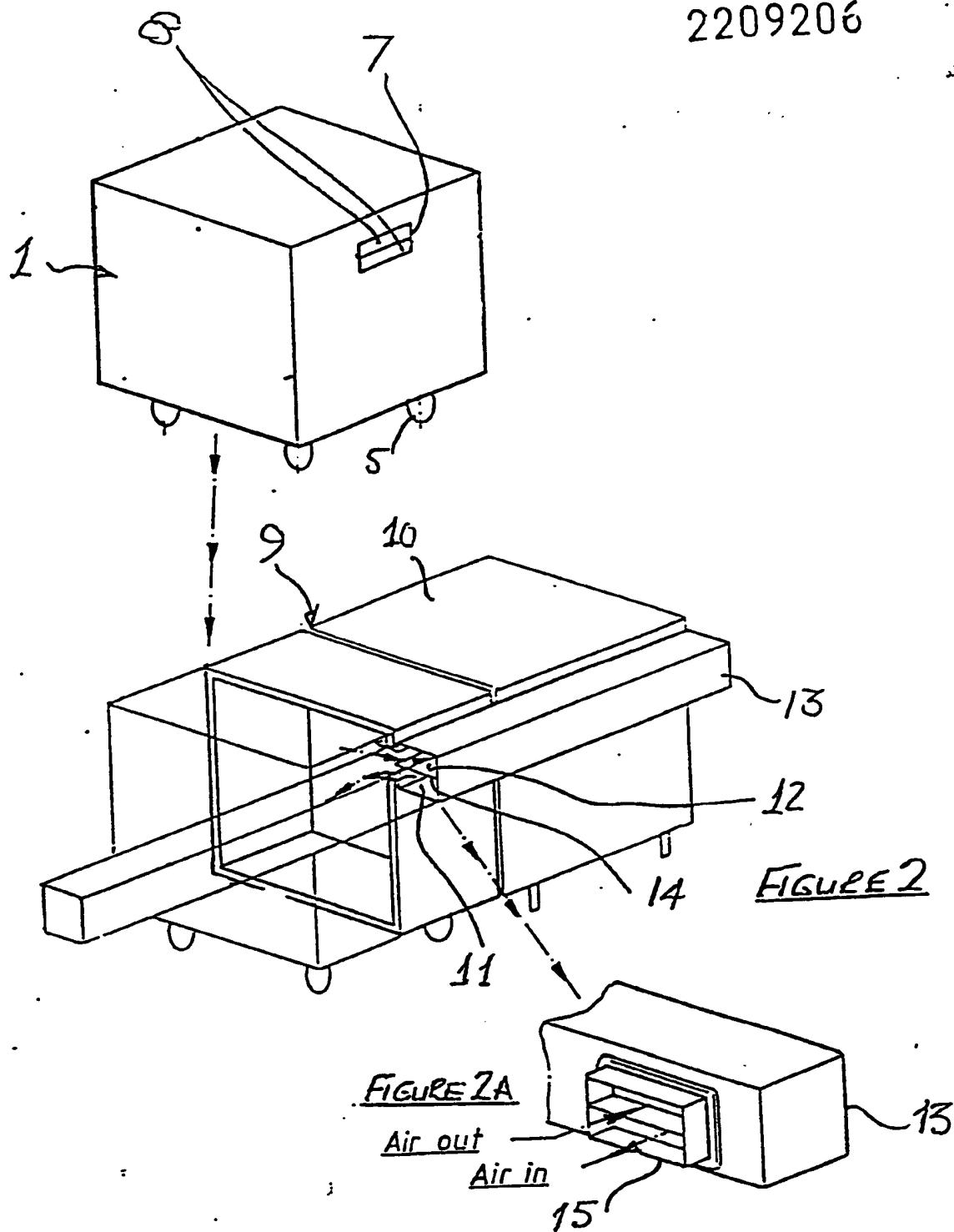
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FIGURE 1

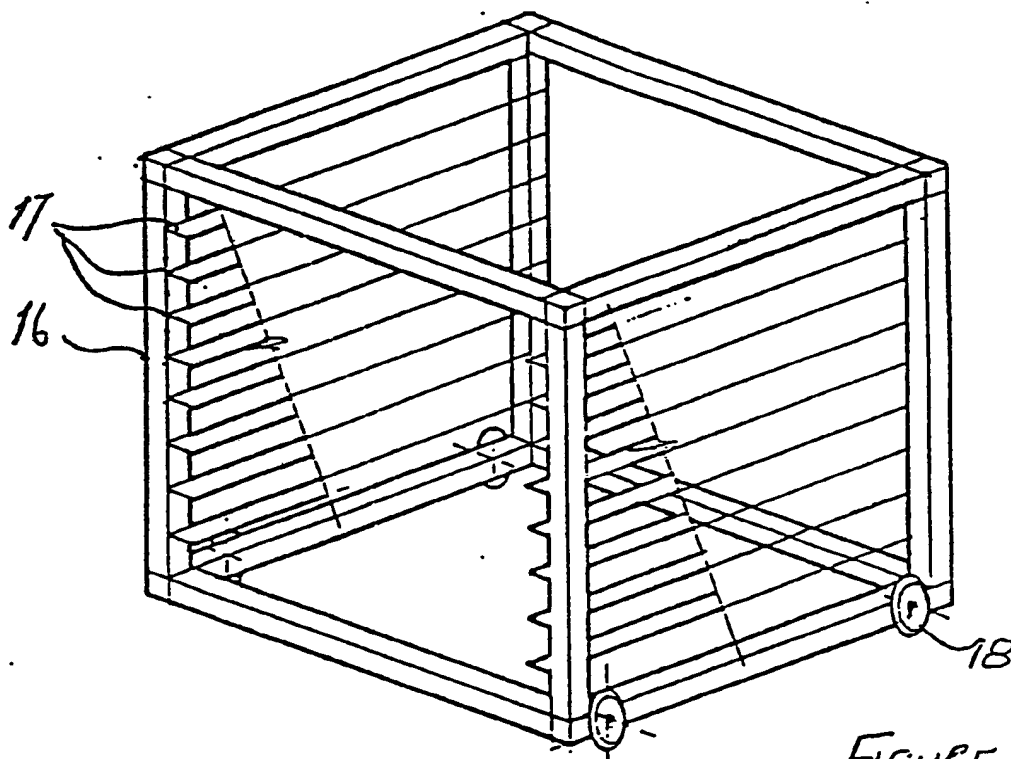
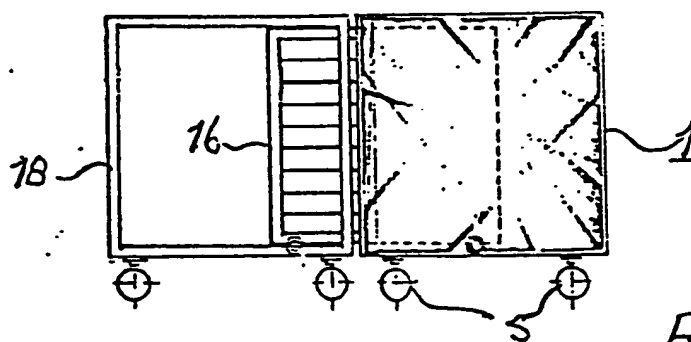


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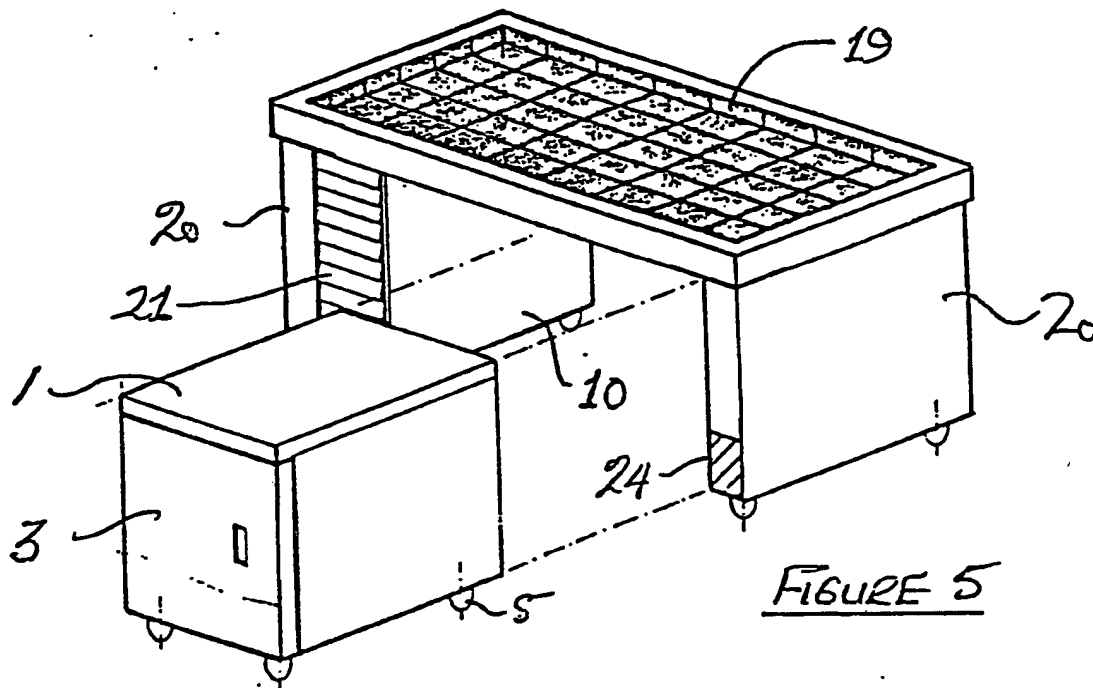
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FIGURE 3FIGURE 4

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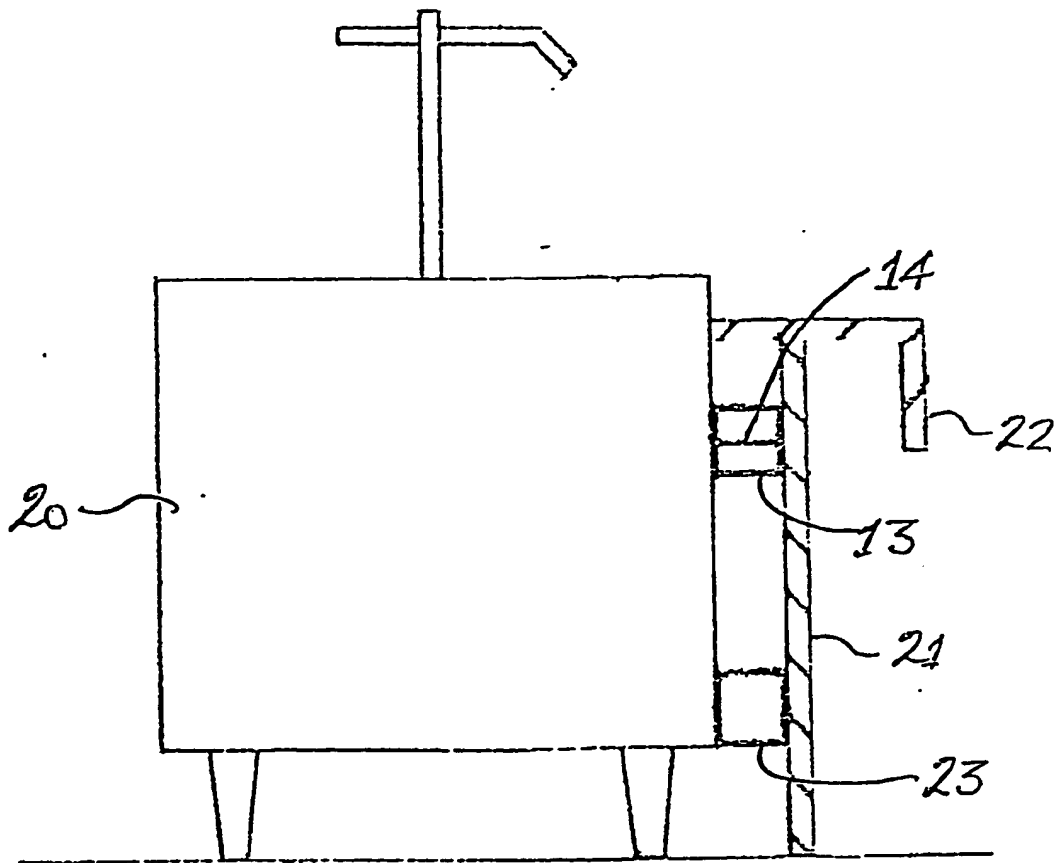
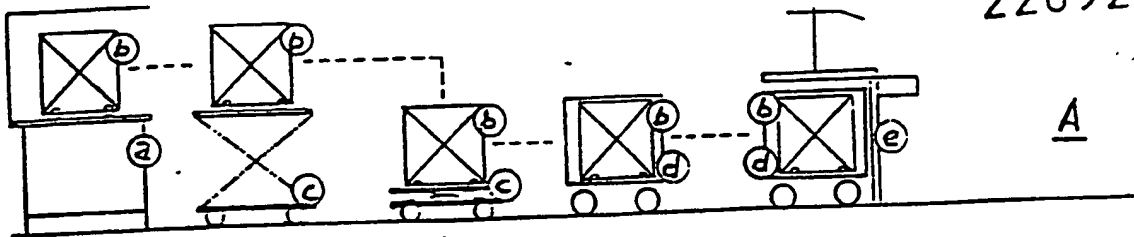
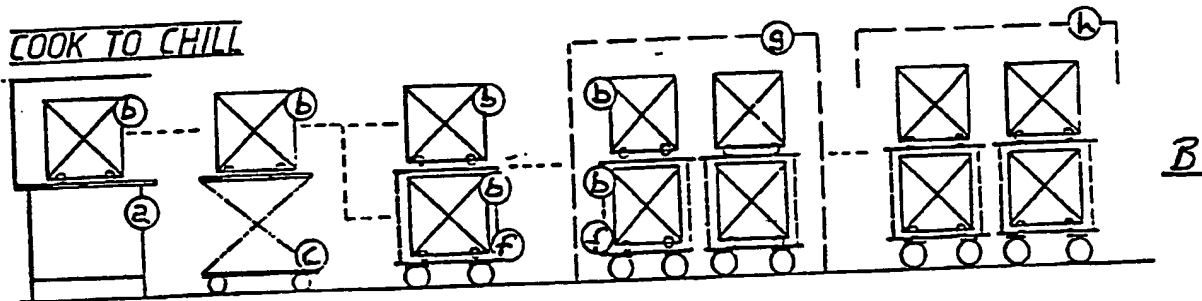
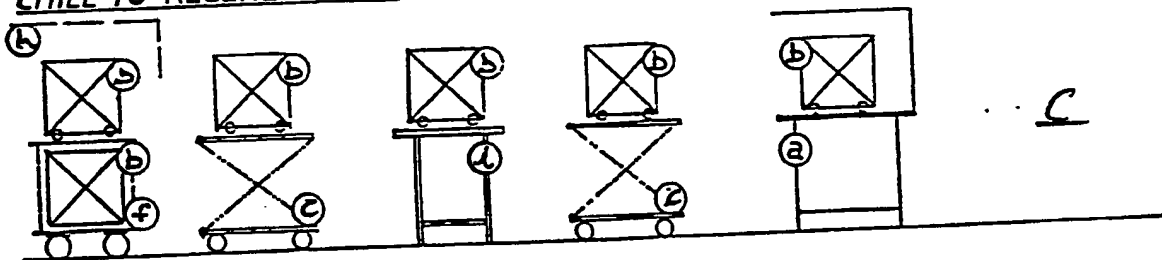


FIGURE 6

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COOK TO SERVICECOOK TO CHILLCHILL TO REGENERATIONFIGURE 7

- a CONVECTION OVEN
- b OVEN RACK
- c SCISSOR TROLLEY
- d CASSETTE
- e COUNTER
- f TRANSPORTER TROLLEY
- g BLAST CHILLER
- h CHILLER STORAGE
- i PREP TABLE

Mobile Food Cassette and Food Distribution System

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This invention relates to mobile food cassettes and to food distribution systems adapted to utilize such cassettes.

5 For large cafeteria areas, works canteens, etc, where there is a heavy demand for serving food and sundry items and/or complete meals, it is absolutely essential to provide an efficient arrangement for transporting the food and sundry items, such as wines, crockery baskets, bulk liquid
10 beverages, etc, which may be hot, refrigerated, or at ambient temperature, from the main preparation, or cooking, area to the point of distribution, normally in the form of service counters. Such transportation is generally by way of trolleys which, for hot food, can include insulated
15 trolleys which are provided with a closable door and built-in electrical heating elements controlled by a thermostat. Thus, after cooking and/or preparation, hot food is loaded into a heated trolley and moved to the distribution point, where the insulation of the trolley can
20 retain the food hot for an appreciable time period. Therefore, if hot food is to be served immediately upon arrival at the distribution point, or within a short time period thereafter, no further heating of this trolley is needed. However, if the food is required to stand for some
25 time before serving, either the trolley is plugged into an electric socket at the distribution point, or the food is transferred to a heated display cabinet, which normally forms part of a service counter for hot food.

A disadvantage of the known distribution systems is the

lack of versatility in the trolleys, preparation and service counters and other equipment, which make it difficult to maintain food of different temperatures whilst being moved throughout the system.

An object of the invention is to provide a mobile cassette and a distribution system for food and sundry items which efficiently enable food and sundry items of different temperature to be transported and maintained at their respective temperatures.

According to a first aspect of this invention, there is provided a mobile cassette for food distribution of the kind comprising an insulated housing with a closable door, electrical heating means within the housing and electrical control means for maintaining the interior of the housing at a required temperature, characterised in that air inlet and outlet openings are provided through the wall of the cabinet which are self-closing and which are adapted to be automatically opened only when the cassette is connected onto a cold/refrigerated ducted air system, the cassette thus being capable of providing a dual temperature facility.

In a preferred form, one aperture is provided through the housing wall with a self-closing shutter, or shutters, which is or are adapted to be pressed inwardly into the housing at the connection point to the ducted air system.

According to a second aspect of the invention, preparation and/or service equipment (eg counters) for distribution of food and sundry items which is adapted to receive a mobile cassette in accordance with the first aspect, is

characterised in that a cold/ refrigerated ducted air system is provided, which includes a compressor and air flow and return passages associated therewith, said air passages having connection points for the air inlet and the air outlet of a said cassette whereby, with the cassette connected and the compressor in operation, cold or refrigerated air as required, flows into and through the cassette.

Preferably, said flow and return air passages are provided by a duct extending from the compressor which is divided internally for flow and return and a single connection point is provided in the duct in the form of a boss spanning the internal divider, said boss, when connected, projecting through a single aperture in the insulated cabinet to provide said air inlet and outlet openings.

Thus, with the electric heating means switched off, a cassette in accordance with the first aspect of the invention can be used in the distribution system for cold or refrigerated food.

It will be appreciated that the invention includes within its scope a distribution system incorporating preparation and service equipment according to the second aspect and one, or preferably a number of cassettes according to the first aspect.

Conveniently a cassette in accordance with the first aspect of this invention may be designed to accommodate a mobile rack which is of open frame construction and is adapted to support a number of tiers of removable shelves, or trays. This enables food to be prepared or cooked, placed onto shelves or trays, and loaded onto the mobile

rack directly from the cooking or refrigeration area. The rack can then be loaded into the cassette if the food is required immediately, or it can be temporarily stored in a hot/chilled or refrigerated environment, according to requirement. It will be appreciated that because the rack is mobile, it can readily be moved to its required position in the system.

During movement through the various stages of food distribution, the rack may be required to be at varying height levels.

According to a feature of this invention, to facilitate movement of the rack between the various stage of food distribution, a support trolley is provided with opposed side frames of a scissors-like construction, which is appropriately powered, e.g. hydraulically, whereby the height of the trolley can be readily adjusted to the various height levels required, i.e. between a cooking/refrigeration level and the cassette.

In order that the invention may be readily understood, one embodiment of mobile cassette and a food distribution system in accordance therewith will now be described with reference to the accompanying, somewhat diagrammatic, drawings, in which:-

Figure 1 is a front perspective view of the cassette,

Figure 2 is a rear perspective view of the cassette and a fragmentary perspective view of the preparation/

service equipment to be used therewith in the food distribution system,

Figure 2A is an enlarged perspective view of a detail of a docking point of the preparation/equipment service for refrigerated air flow,

Figure 3 is a perspective view showing a mobile rack for the cassette,

Figure 4 is a side view showing loading/unloading of the cassette,

Figure 5 is a perspective view of a refrigerated service counter to which the cassette can be connected,

Figure 6 is a part-sectioned side view of the counter of Figure 5, and

Figure 7 is a flow chart for various operating modes in the food distribution system.

Referring to Figures 1 and 2 the mobile cassette comprises a housing 1 defined by insulated side, top and bottom walls having an opening in one front side wall 2 which is closed by an insulated, hinged door 3 provided with a latch 4. The cassette is made mobile by being mounted on wheels, or castors 5, which may be pivotably mounted on the underside of the housing. The housing is equipped internally with electrical heating means, which via a suitable temperature control arrangement, are operated to maintain the internal temperature of the housing at a required level (indicated by a thermometer 6). The rear wall of the housing is provided with a rectangular aperture 7 (see Figure 2) which is normally closed by a pair of

spring-loaded shutters 8.

It is intended that the cassette is used in conjunction with preparation and/or service equipment which provides a ducted refrigerated air system. Consequently, the aperture 7 is dimensioned and positioned so that it can be docked onto a connection point in the ducted refrigerated air system. Thus, the equipment (see Figure 2) includes a housing 10 for a compressor (not shown) from which flow and return air passages 11, 12. extend. These air passages are provided with a length of ducting 13 having an internal divider 14, and the connection point is provided by a rectangular boss 15 in a side wall of the ducting (see Figure 2A) which spans across the divider 14. Thus, for docking, the cassette is pushed bodily towards the ducting at the connection point and the boss 15 fits into the aperture 7 and automatically opens the shutters 8, whereafter the compressor is operated to blow cold/ refrigerated air into the cassette. It will be appreciated that a length of such ducting 13 could be provided around the preparation area and a number of connection points provided to chill or refrigerate a number of cassettes containing newly prepared food. Also, an air ducting system would be provided at each service counter where there is a requirement to maintain food in a chilled or refrigerated condition.

Referring to Figures 3 and 4 of the drawings, the mobile cassette can be used in conjunction with a mobile inner support rack 16 which is of open frame construction and has a series of pairs of shelf or tray supports 17. The

rack 16 is also mobile and hence is provided with wheels 18 and is designed to accommodate a series of trays or shelves (not shown) of unit size. Thus, after cooking and/or preparation, food can be placed on the shelves or trays which are then loaded into the open rack 16. The loaded rack may then be fitted into an open frame transporter 18 of similar dimensions to the cassette, which can thus be easily aligned with the cassette opening for loading (see Figure 4). Alternatively, the rack 16 can be placed on a raising and lowering trolley, such as a hydraulically operated scissors trolley, and lowered to an appropriate height for alignment with the cassette opening to effect loading. In this case, the transporter 18 would not be necessary.

Referring to Figure 5, a suitable refrigerator counter is shown comprising a top having a dome well 19 (which could also be flat) supported on side walls 20. A compressor is provided within a housing 10 having a louvred access door 21 located adjacent the left hand side wall 20. It will be noted that the cassette 1 is intended to locate near one side of the counter, under the counter top and within guides, to ensure that the cassette docks accurately onto its connection point for the ducted air system. Referring to Figure 6, it will be seen that the counter is provided on its front face with a decorative front panel 21 and tray slide 22, the rear surface of the panel supporting the air ducting 13 and a services duct 23 for electrical cables, pipework, etc. Where the service counter is to be used both for hot and chilled/refrigerated food, the cassette 1 in its

hot mode would simply be plugged into an electrical socket 24 provided at a convenient location on the counter (see Figure 5).

5 The mobile cassette and ducted air system described above can be utilized with great versatility in a food distribution system. Thus, referring to Figure 7, three modes of operation (A, B, C) are shown diagrammatically, by way of example. In the Figure, flow charts of food
10 preparation, movement, storage, and service are shown for the different modes of operation, the associated equipment being referenced as follows:-

- a Convection Oven
- b Oven Rack
- 15 c Scissor Trolley
- d Cassette
- e Counter
- f Transporter Trolley
- g Blast Chiller
- 20 h Chiller Storage, and
- i Preparation Table

From the foregoing, it will be appreciated that, because the cassette is designed to run under the food service counter, there is total flexibility in the types of
25 food that can be distributed through a service counter. Also, it will be noted that the underside of the counter is totally open and, if required, could be designed to accommodate more than one cassette. In this case, if required, a connection point to the ducted air system could

be provided at each cassette location.

It will also be appreciated that not all service
counters in a food distribution system may need to be
provided with a ducted air system, since at some locations
only hot food, only chilled/refrigerated food, or only food
and sundry items at ambient temperature may be served.

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C L A I M S

1. A food distribution system comprising a mobile cassette having an insulated housing with a closable door, electrical heating means within the housing and electrical control means for maintaining the interior of the housing at a required temperature, characterised in that air inlet and outlet openings are provided through the wall of the housing which are self-closing and which are adapted to be automatically opened only when the cassette is connected onto a cold/refrigerated ducted air flow of the system, the cassette thus being capable of providing a dual temperature facility.
2. A system according to Claim 1, characterised in that said air inlet and outlet openings are defined by one aperture extending through the housing wall with a self-closing shutter, or shutters, which is or are adapted to be pressed inwardly into the housing at the connection point to the ducted air flow.
3. A system according to Claim 1, or 2, characterised in that said mobile cassette is designed to accommodate a mobile rack which is of open frame construction and is adapted to support a number of tiers of removable shelves, or trays, whereby to enable food to be prepared or cooked, placed onto shelves or trays, and loaded onto the mobile rack directly from a cooking or a refrigeration area.
4. A system according to Claim 3, characterised in that said mobile rack is adjustable to varying height levels required throughout the system.

5. A system according to Claim 4, characterised in that a support trolley is provided with opposed side frames of a scissors-like construction to facilitate movement of the rack between the various stages of food distribution, and in that said trolley is powered, e.g. hydraulically, whereby
5 the height of the trolley can be readily adjusted to the various height levels required, i.e. between a cooking/refrigeration level and the cassette.

6. A system according to any preceding Claim including preparation and/or service equipment (eg counters) for the
10 distribution of food and sundry items adapted to receive a said mobile cassette, characterised in that a cold/refrigerated ducted air flow is provided, which includes a compressor and air flow and return passages associated therewith, said air passages having connection
15 points for the air inlet and outlet openings of the cassette whereby, with the cassette connected and the compressor in operation, cold or refrigerated air as required, flows into and through the cassette.

7. A system according to Claim 6 when dependent upon
20 Claim 2, characterised in that said flow and return air passages are provided by a duct extending from said compressor which is divided internally for flow and return and a single connection point is provided in the duct in the form of a boss spanning the internal divider, said boss,
25 when connected, projecting through a single aperture in the insulated cabinet to provide said air inlet and outlet openings.

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